

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2004/008580

A. CLASSIFICATION OF SUBJECT MATTER  
Int.Cl<sup>7</sup> B23K20/12

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
Int.Cl<sup>7</sup> B23K20/12Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  
Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2004  
Kokai Jitsuyo Shinan Koho 1971-2004 Toroku Jitsuyo Shinan Koho 1994-2004

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
<u>X</u> <u>Y</u> A	JP 2000-153374 A (Hitachi, Ltd.), 06 June, 2000 (06.06.00), Detailed explanation of the invention; Par. Nos. [0010] to [0012], [0024]; Fig. 6 (Family: none)	<u>1-2, 6, 20</u> <u>3-5, 17-18</u> 7-12
<u>Y</u> A	GB 2306366 A (THE WELDING INSTITUTE), 07 May, 1997 (07.05.97), Page 13, lines 17 to 23; Figs. 9A to 9B (Family: none)	<u>3, 21</u> 1-2, 4-20, 22
<u>X</u> <u>Y</u> A	JP 2002-66760 A (Mazda Motor Corp.), 05 March, 2002 (05.03.02), Column 5, lines 24 to 41; column 6, lines 4 to 46; column 7, lines 20 to 48; Figs. 8, 10 to 13 (Family: none)	<u>10-12, 15-16</u> <u>13-14</u> 1-9, 17-22

☒ Further documents are listed in the continuation of Box C.☐ See patent family annex.

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

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"O" document referring to an oral disclosure, use, exhibition or other means

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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&amp;" document member of the same patent family

Date of the actual completion of the international search  
03 September, 2004 (03.09.04)Date of mailing of the international search report  
21 September, 2004 (21.09.04)Name and mailing address of the ISA/  
Japanese Patent Office

Authorized officer

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## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
<u>Y</u> A	JP 2001-314982 A (Kawasaki Heavy Industries, Ltd.), 13 November, 2001 (13.11.01), Detailed explanation of the invention; Par. Nos. [0023] to [0024]; Fig. 2 & EP 1153694 A2	<u>4-5</u> 1-3, 6-22
<u>Y</u> A	JP 10-230376 A (Showa Aluminum Corp.), 02 September, 1998 (02.09.98), Claim 1; Figs. 1, 3 (Family: none)	<u>17</u> 1-16, 18-22
<u>Y</u> A	JP 2002-126881 A (Kawasaki Heavy Industries, Ltd.), 08 May, 2002 (08.05.02), Claims 1 to 3; detailed explanation of the invention; Par. Nos. [0010] to [0013]; Figs. 1 to 4 (Family: none)	<u>13-14, 18</u> 1-12, 15-17, 19-22
<u>X</u> A	JP 2003-136256 A (Mazda Motor Corp.), 14 May, 2003 (14.05.03), Claims 1 to 4; Fig. 3 (Family: none)	<u>7, 9, 19, 22</u> 1-6, 8, 10-18, 20-21
A	JP 2001-321967 A (Sumitomo Light Metal Industries, Ltd.), 20 November, 2001 (20.11.01), Claim 4 (Family: none)	1-22
E, A	JP 2003-260573 A (Kawasaki Heavy Industries, Ltd.), 16 September, 2003 (16.09.03), Column 10, lines 4 to 22; Fig. 10 (Family: none)	1-22
E, A	JP 2004-174508 A (Kawasaki Heavy Industries, Ltd.), 24 June, 2004 (24.06.04), Detailed explanation of the invention; Par. Nos. [0181] to [0188]; Figs. 32 to 34 (Family: none)	1-22